

UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF OKLAHOMA

STATE OF OKLAHOMA, ex. rel. W.A. DREW )  
EDMONDSON, in his capacity as ATTORNEY )  
GENERAL OF THE STATE OF OKLAHOMA )  
and OKLAHOMA SECRETARY OF THE )  
ENVIRONMENT, J. D. Strong, in his the )  
capacity as the TRUSTEE FOR NATURAL )  
RESOURCES FOR THE STATE OF )  
OKLAHOMA, )

Plaintiffs, )

Case No. 05-CV-329-GKF-SAJ

v. )

TYSON FOODS, INC., TYSON )  
POULTRY, INC., TYSON CHICKEN, INC., )  
COBB-VANTRESS, INC., AVIAGEN, INC., )  
CAL-MAINE FOODS, INC., CAL-MAINE )  
FARMS, INC., CARGILL, INC., CARGILL )  
TURKEY PRODUCTION, LLC, GEORGE'S, )  
INC., GEORGE'S FARMS, INC., PETERSON )  
FARMS, INC., SIMMONS FOODS, INC., and )  
WILLOW BROOK FOODS, INC., )

Defendants. )

EXPERT REPORT OF

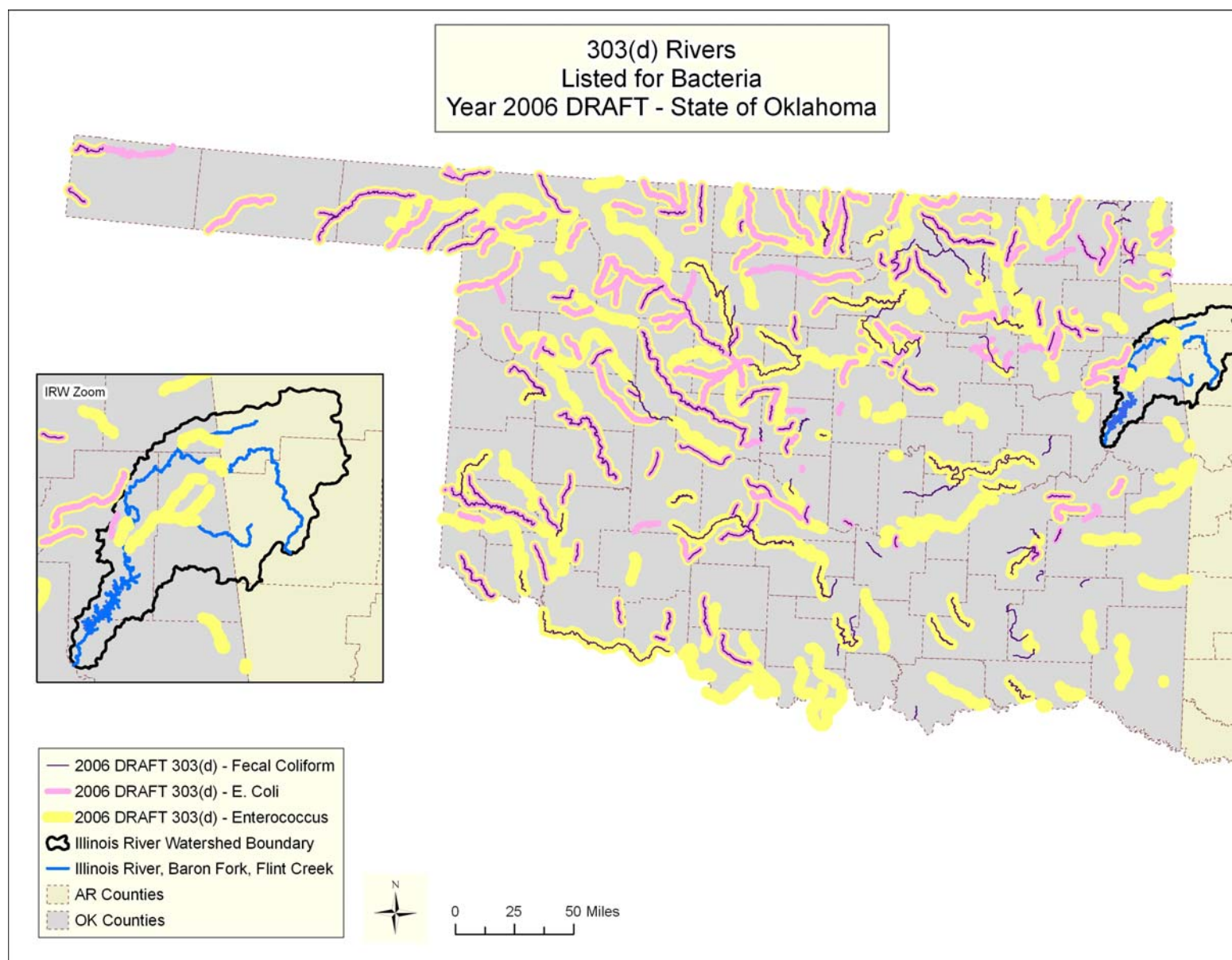


Timothy J. Sullivan, Ph.D.  
President

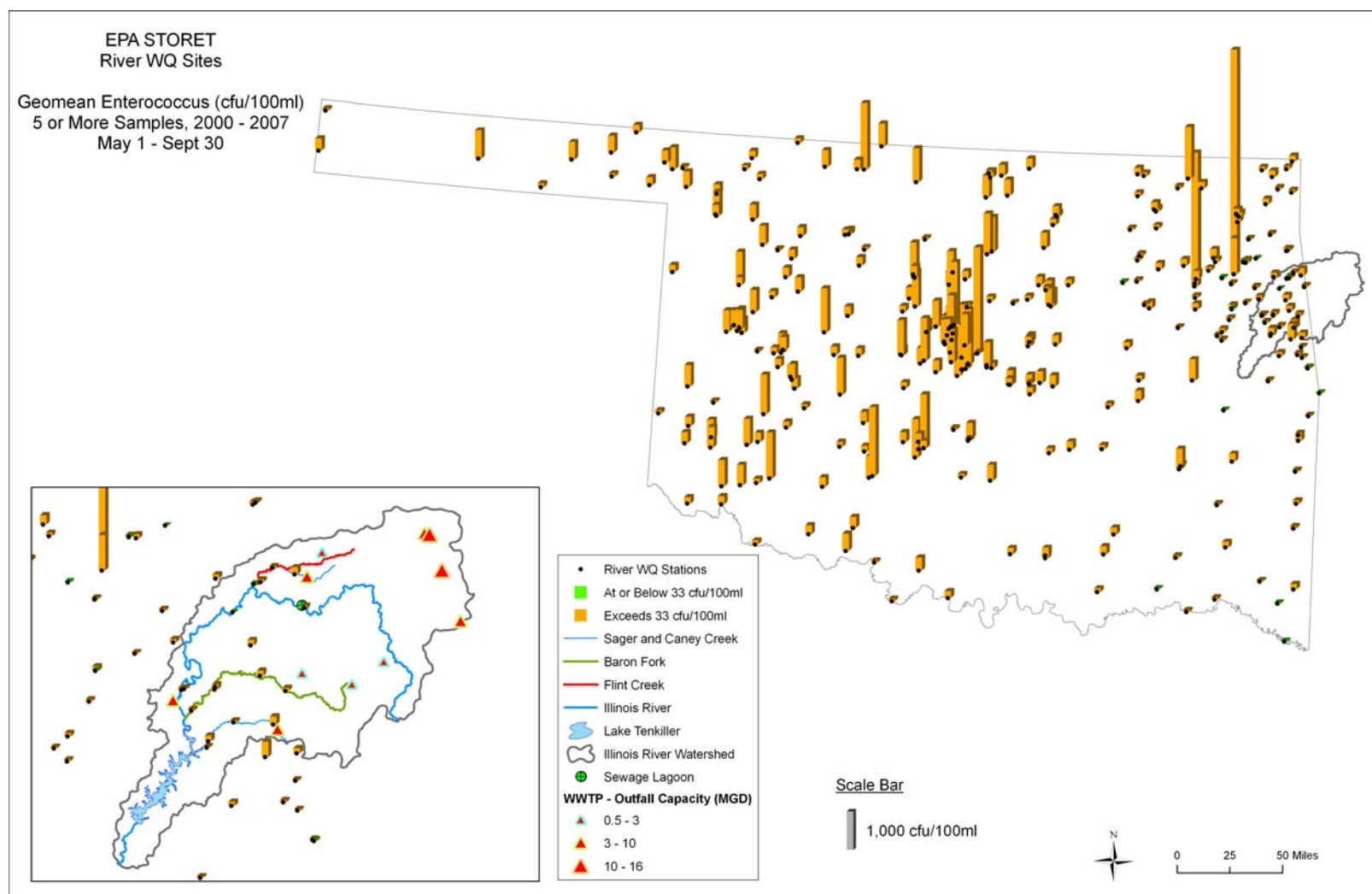


Environmental  
Chemistry, Inc.

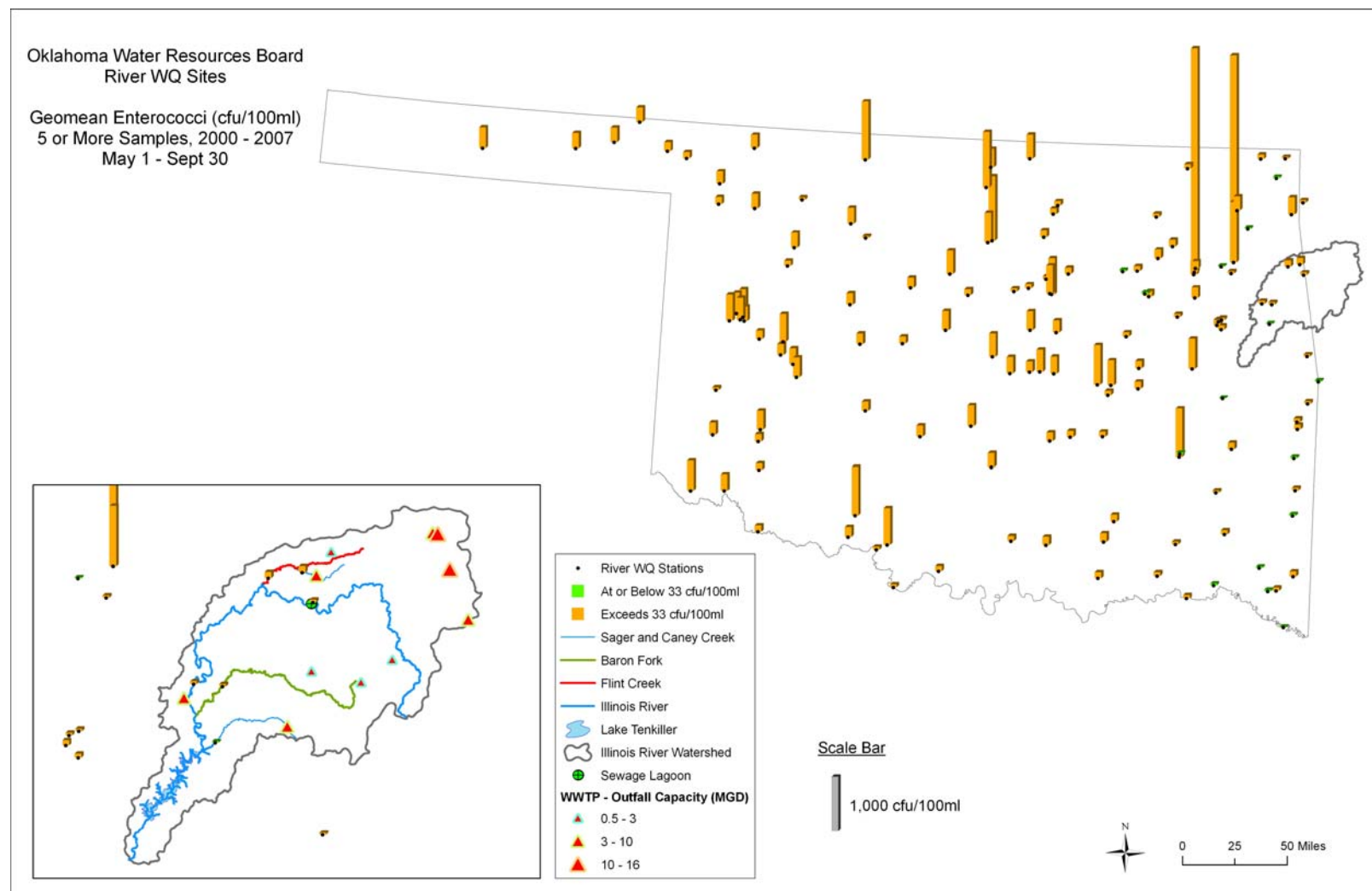
January 29, 2009



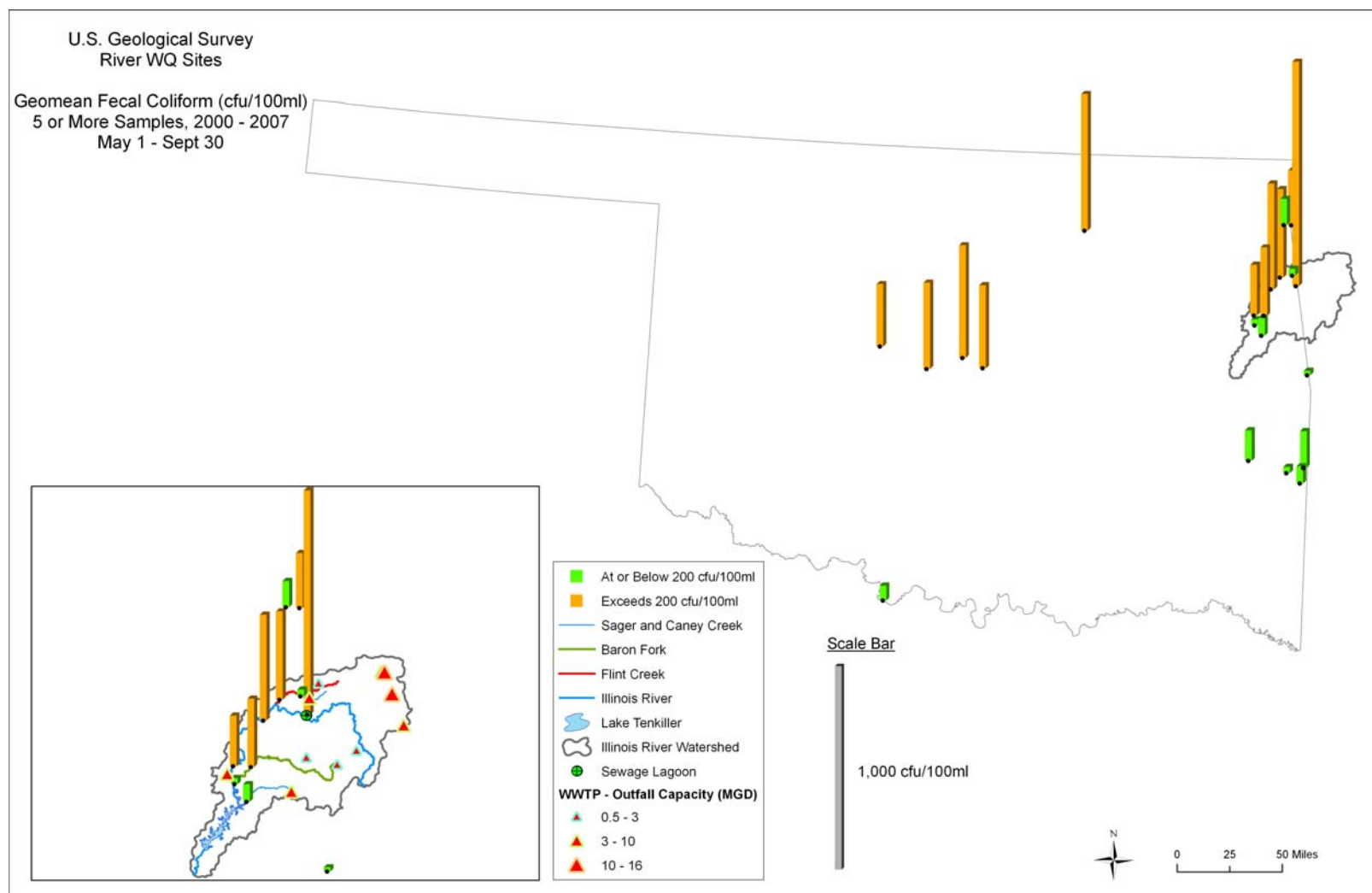
**Figure 2-4. Streams within Oklahoma that are 303(d) listed for bacteria, based on the 2006 303(d) list. Listings are shown separately for fecal coliform bacteria, *E. coli*, and enterococcus. Listings are widespread throughout the state. The spatial data for 2008 303(d) listings were not available at the time this map was produced. (Source: Oklahoma Department of Environmental Quality)**



**Figure 2-6.** Map showing the geomean of enterococcus bacteria concentrations measured at all sites in Oklahoma represented in EPA's STORET database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green.

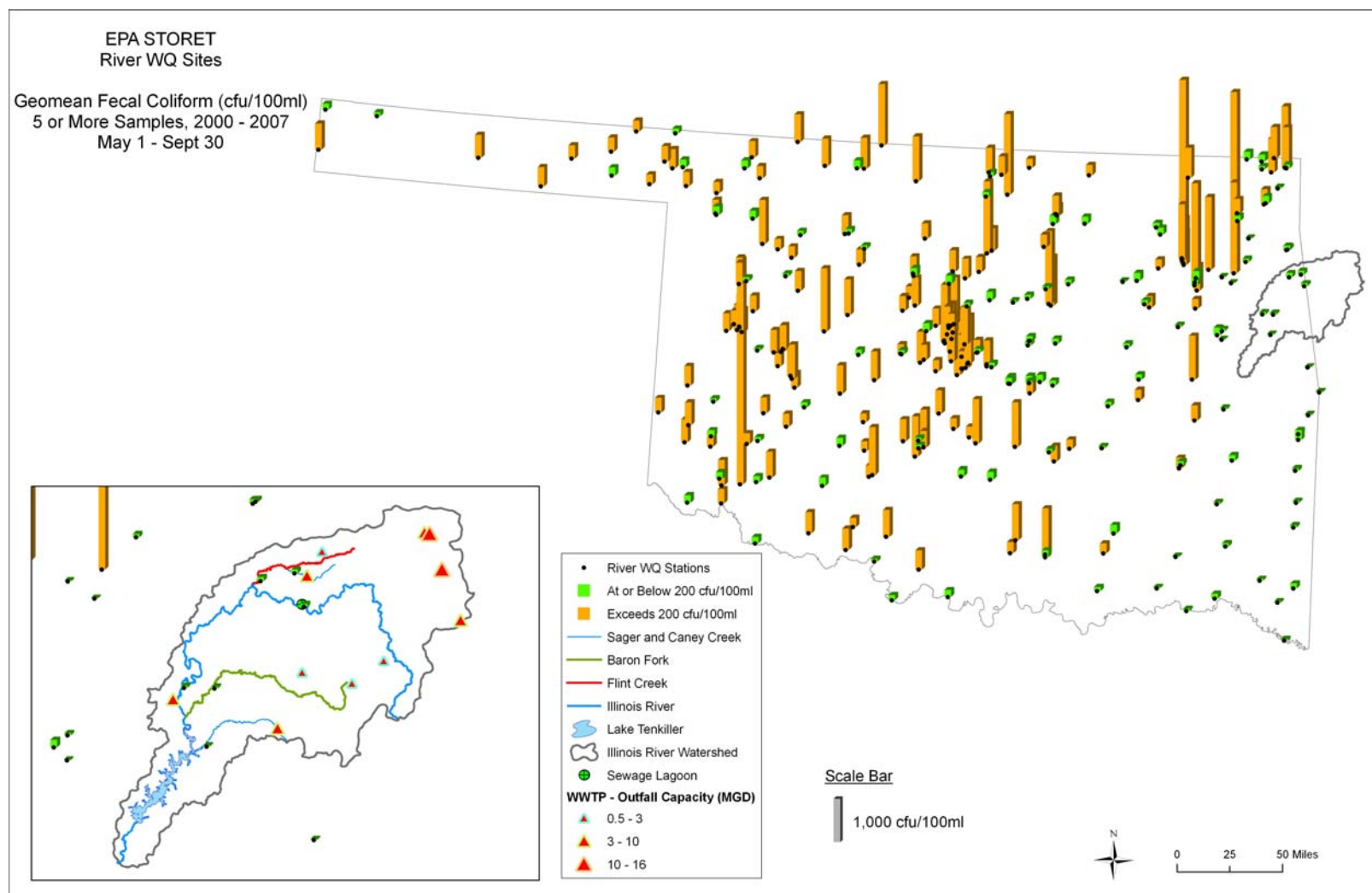


**Figure 2-7.** Map showing the geomean of enterococcus bacteria concentrations measured at all sites in Oklahoma represented in OWRB's database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green.

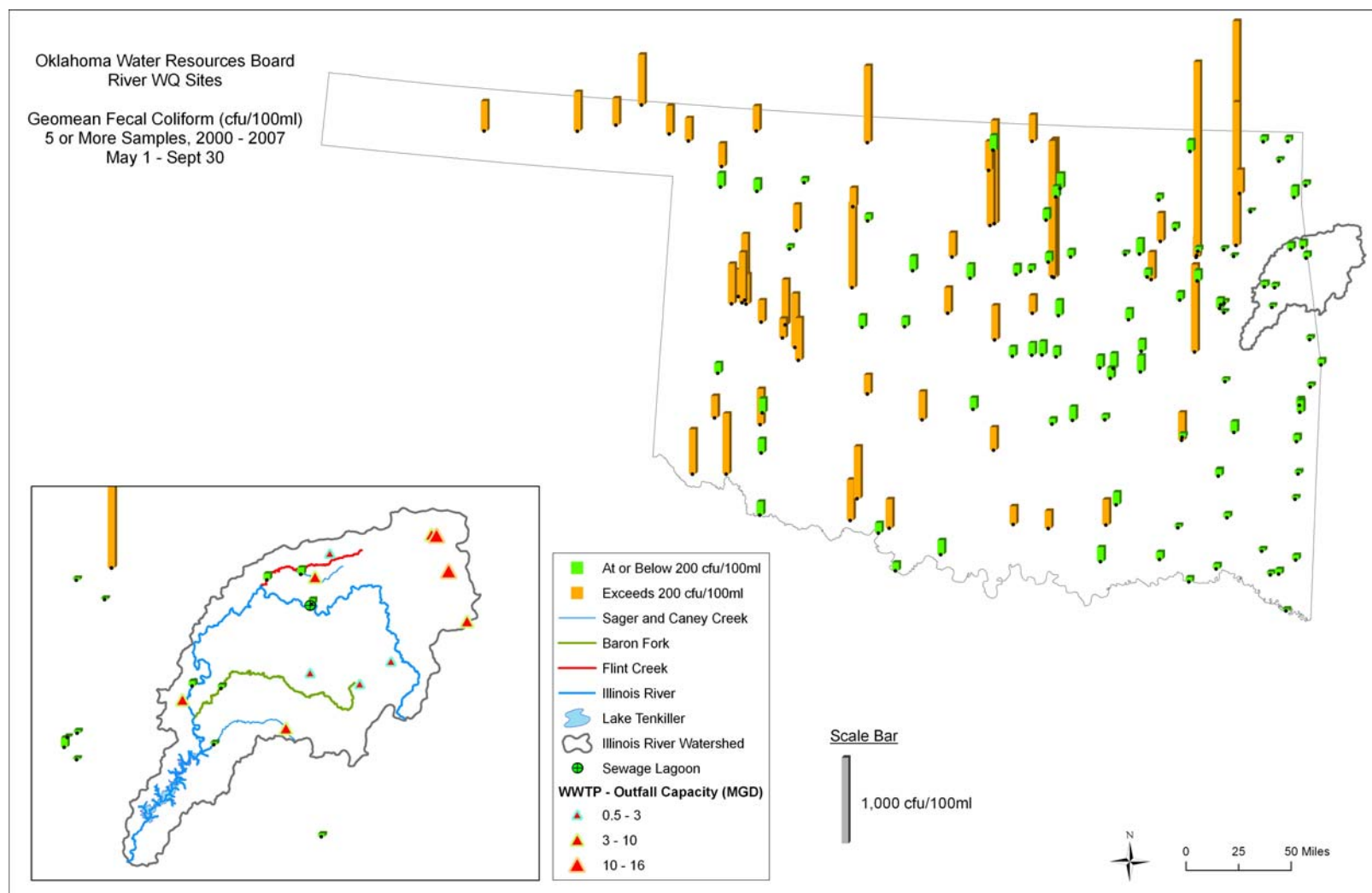


**Figure 2-8.** Map showing the geomean of fecal coliform bacteria concentrations measured at all sites in Oklahoma represented in USGS's database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green. Note that because relatively few sites within Oklahoma were sampled by USGS, these data are not particularly helpful on their own in evaluating statewide patterns.





**Figure 2-9.** Map showing the geomean of fecal coliform bacteria concentrations measured at all sites in Oklahoma represented in EPA's STORET database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green.



**Figure 2-10. Map showing the geomean of fecal coliform bacteria concentrations measured at all sites in Oklahoma represented in OWRB's database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green.**

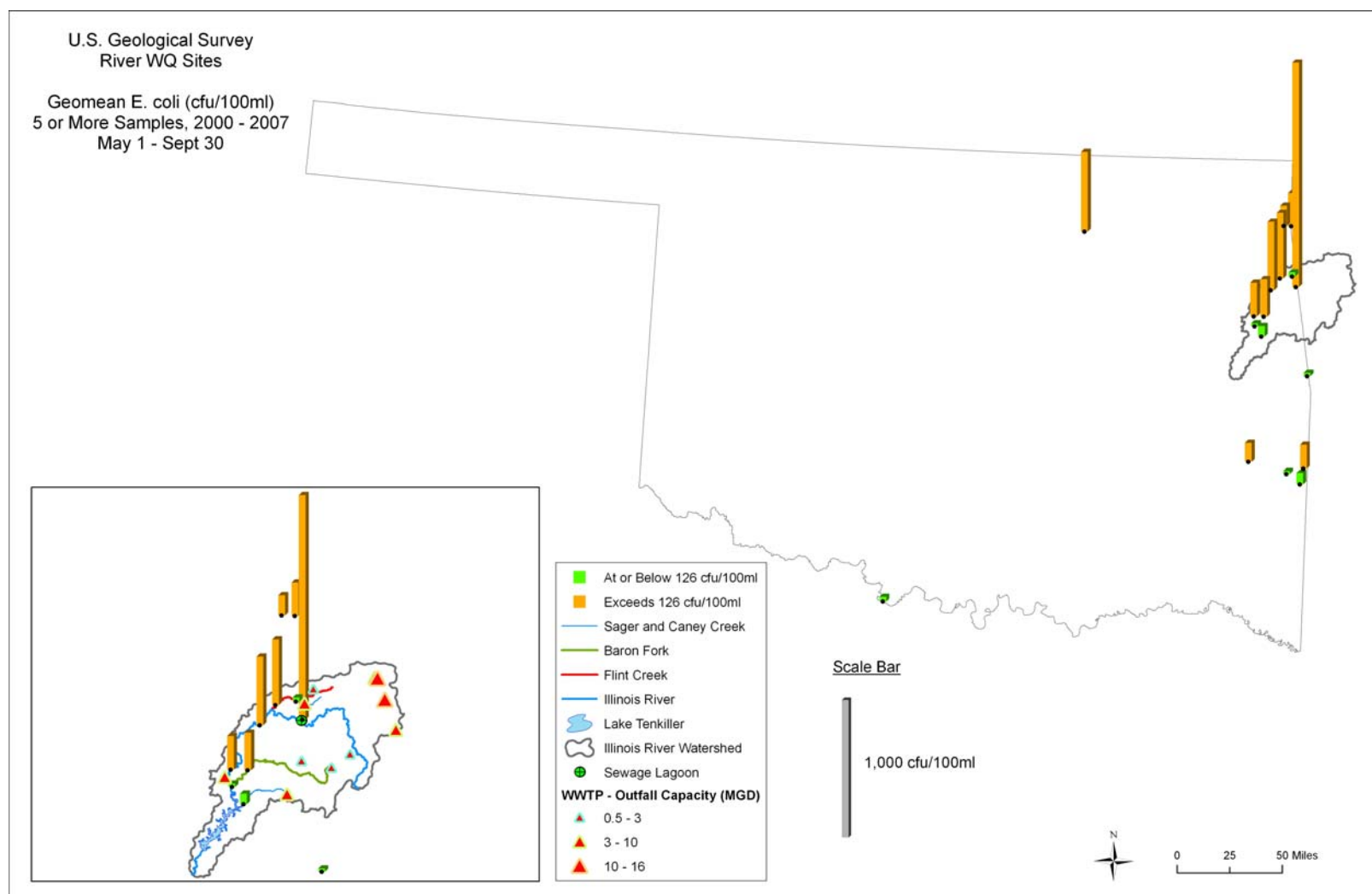


Figure 2-11. Map showing the geomean of *E. coli* concentrations measured at all sites in Oklahoma represented in USGS's database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green. Note that because relatively few sites within Oklahoma were sampled by USGS, these data are not particularly helpful on their own in evaluating statewide patterns.



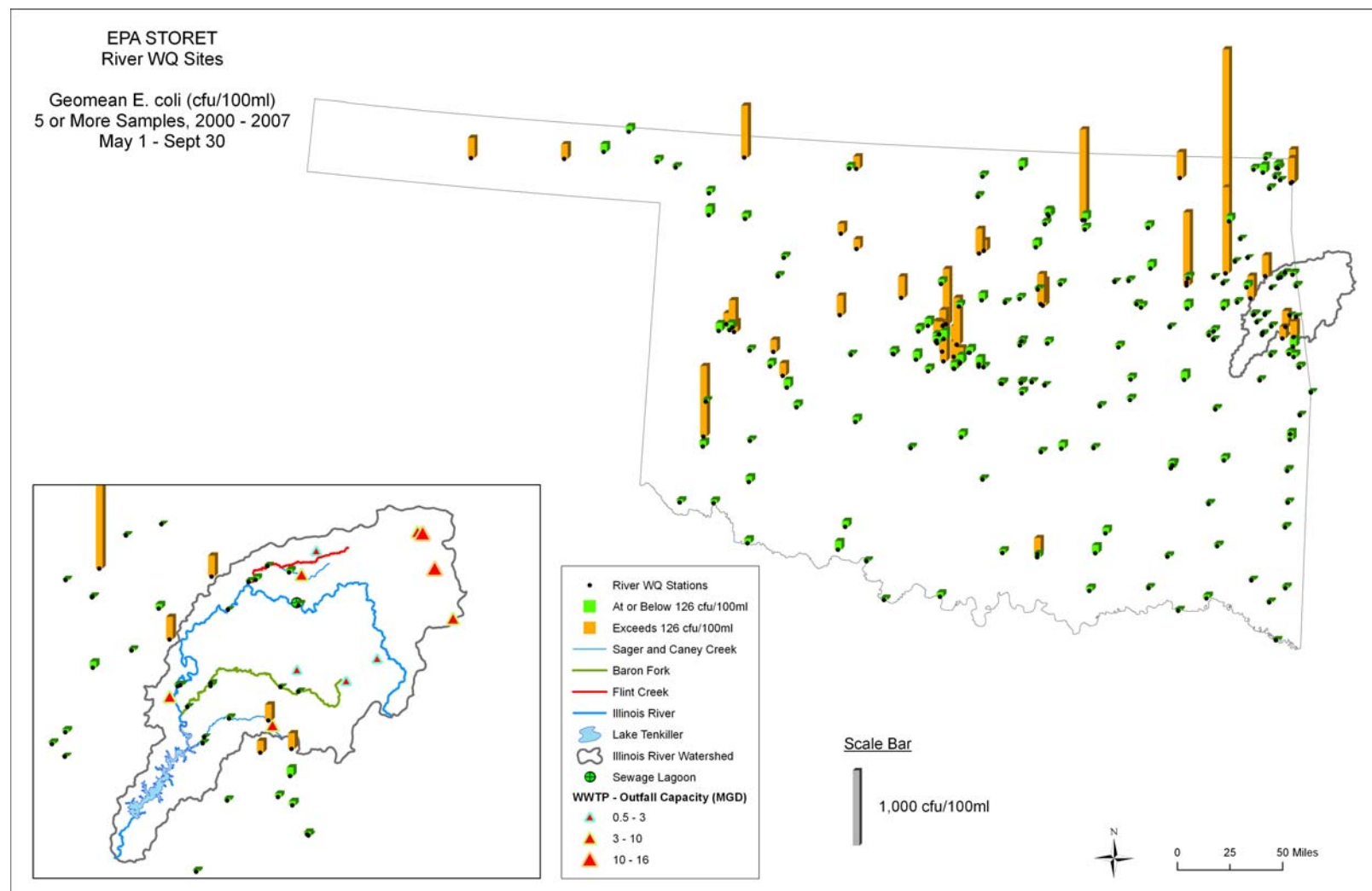
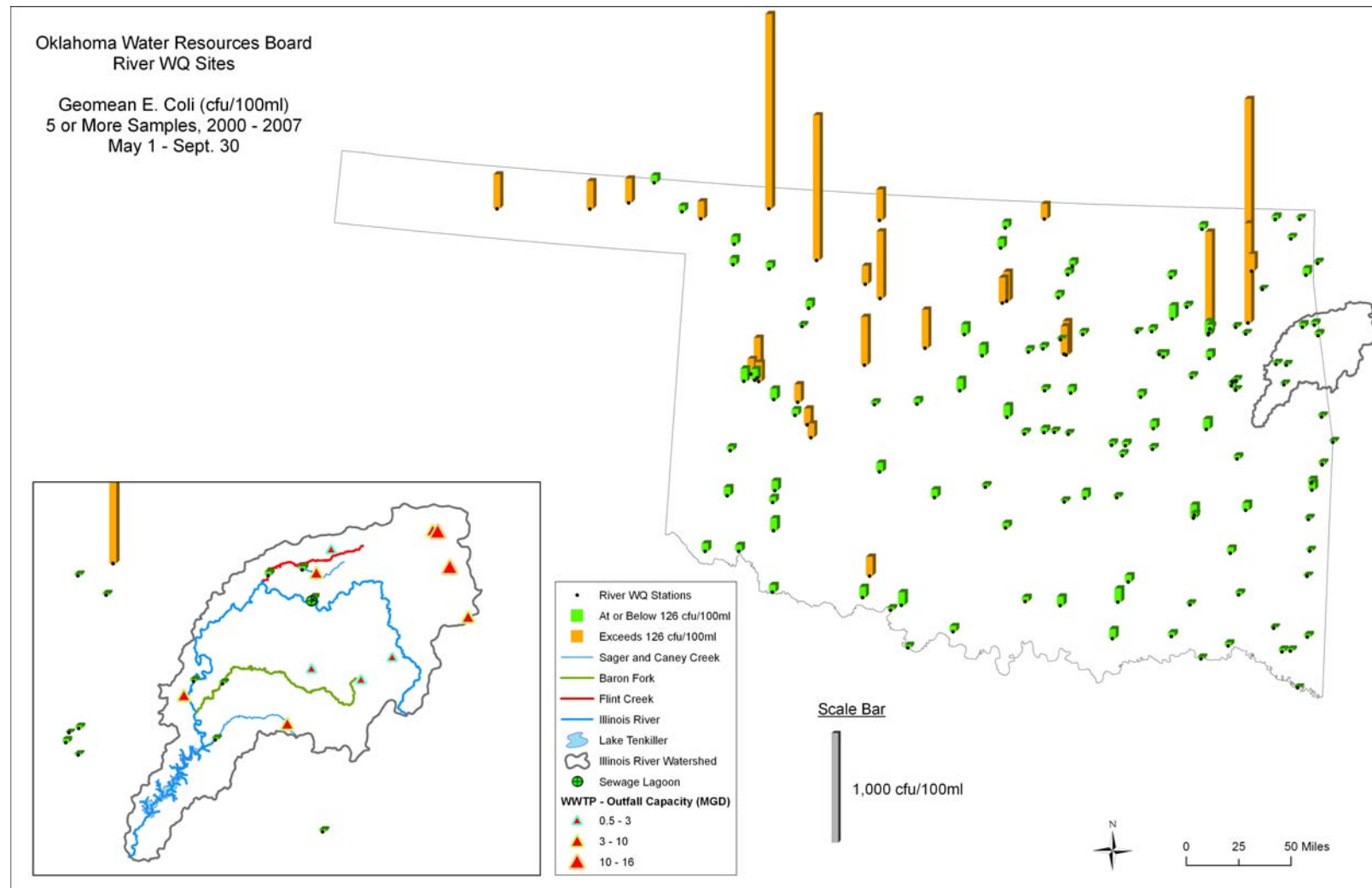
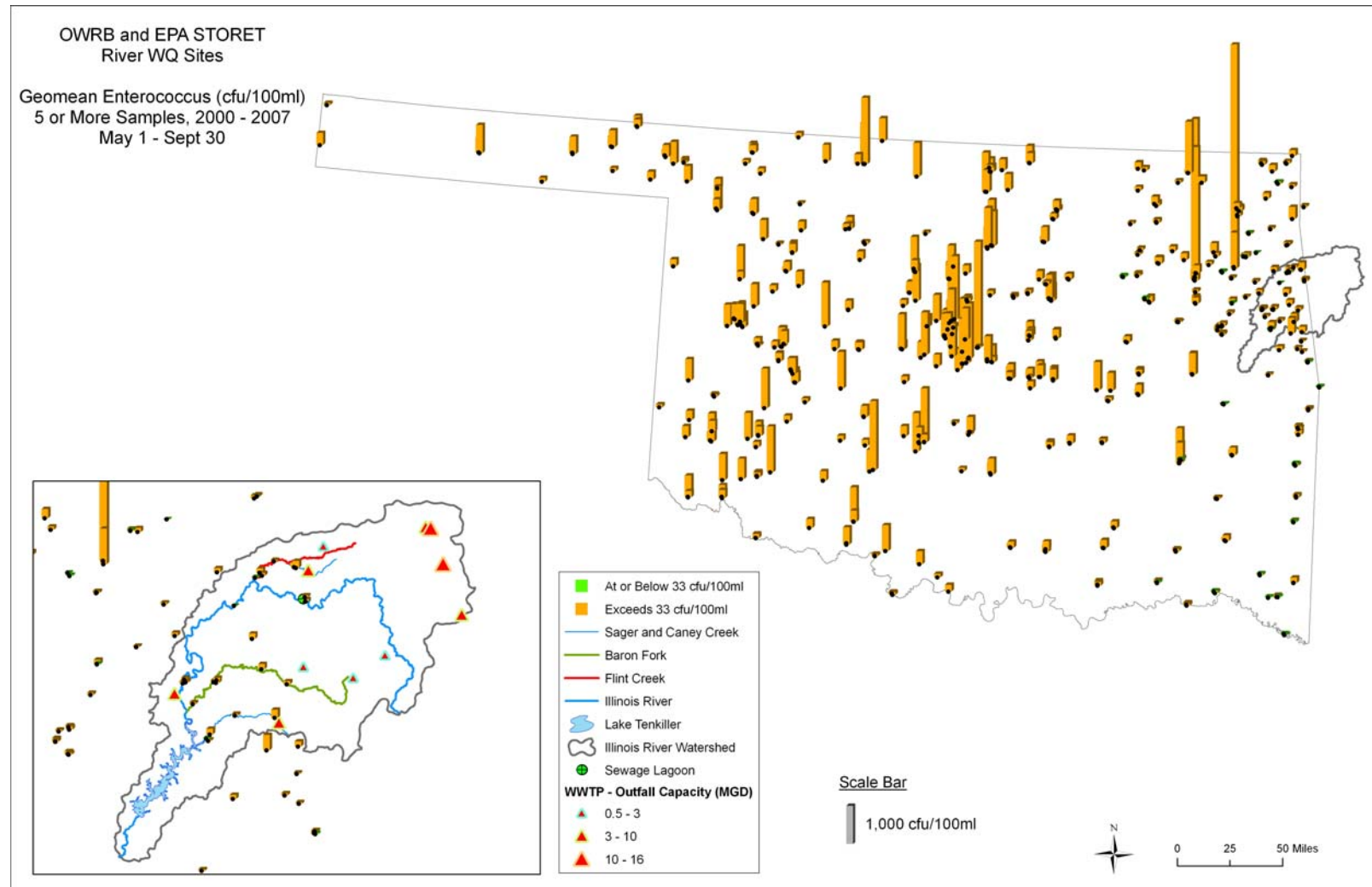


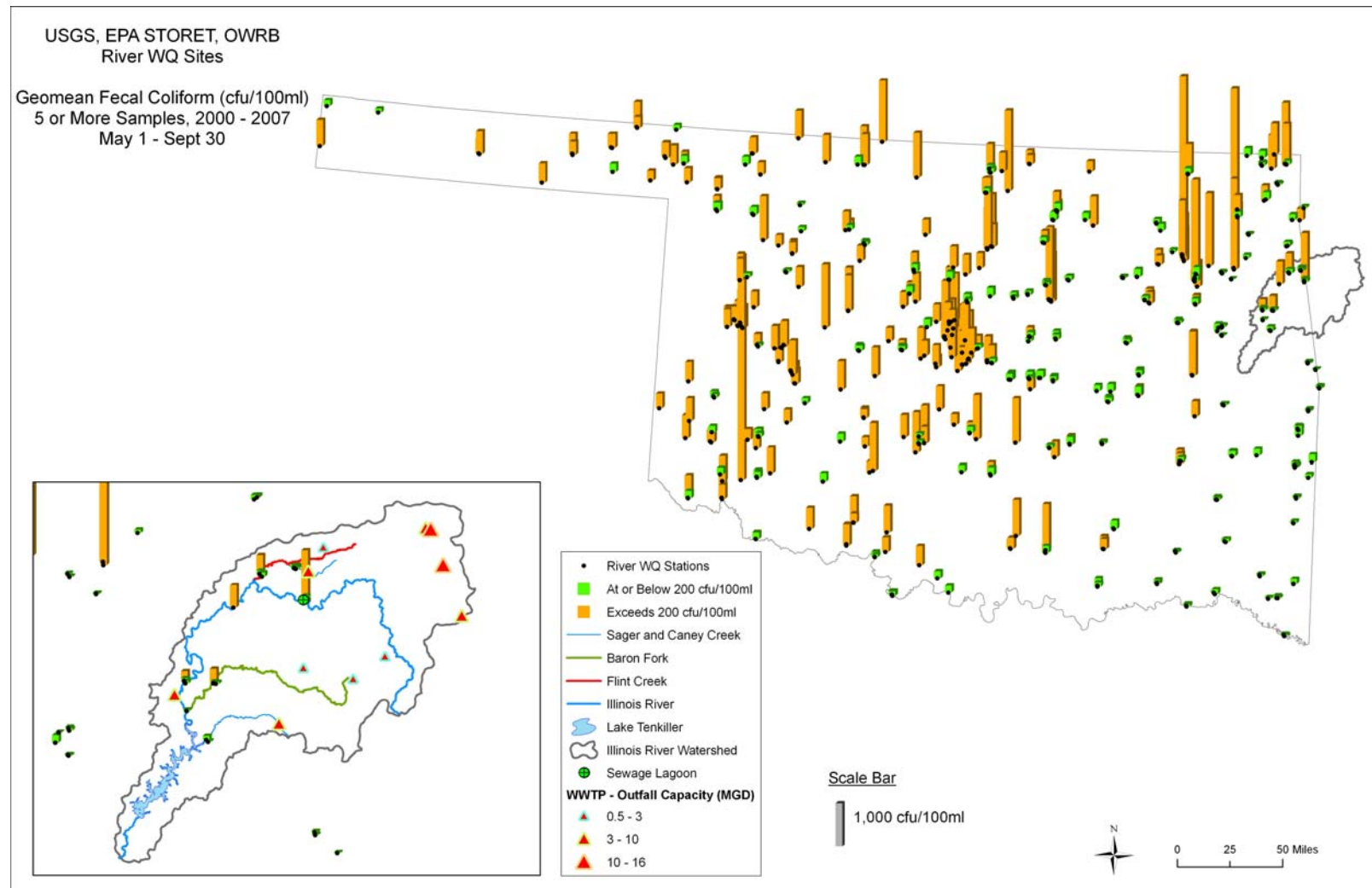
Figure 2-12. Map showing the geomean of *E. coli* concentrations measured at all sites in Oklahoma represented in EPA's STORET database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green.



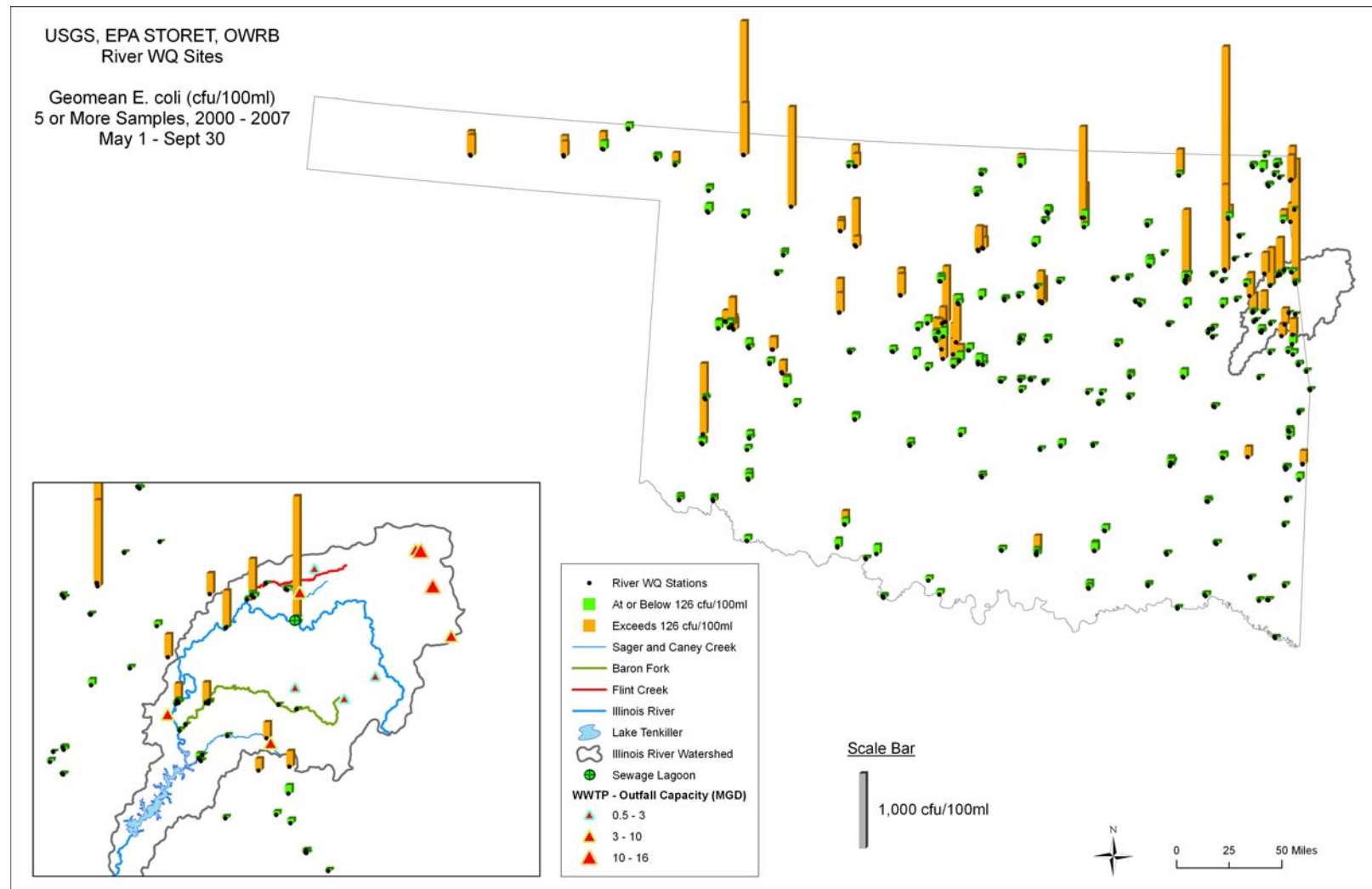
**Figure 2-13.** Map showing the geomean of *E. coli* concentrations measured at all sites in Oklahoma represented in OWRB's database by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green.



**Figure 2-15.** Map showing the geomean of enterococcus concentrations measured at all sites in Oklahoma represented in OWRB's and EPA's STORET databases by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green.



**Figure 2-16. Map showing the geomean of fecal coliform bacteria concentrations measured at all sites in Oklahoma represented in USGS's, EPA's STORET, and OWRB's databases by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green. The highest bar within the IRW is located directly adjacent to the sewage lagoon at Watts, OK.**



**Figure 2-17.** Map showing the geomean of *E. coli* concentrations measured at all sites in Oklahoma represented in USGS's, EPA's STORET, and ORWB's databases by five or more samples during the recreational period (May 1 to September 30) during the years 2000 through 2007. The height of each bar is proportional to the geomean bacteria concentration. Dots at the base of each bar show the locations of sample collection. The boundaries of the IRW are shown in eastern Oklahoma and northwestern Arkansas. Samples that exceed the primary contact geomean standard are shown in orange; those that do not exceed the standard are shown in green. The highest bar within the IRW is located directly adjacent to the sewage lagoon at Watts, OK.